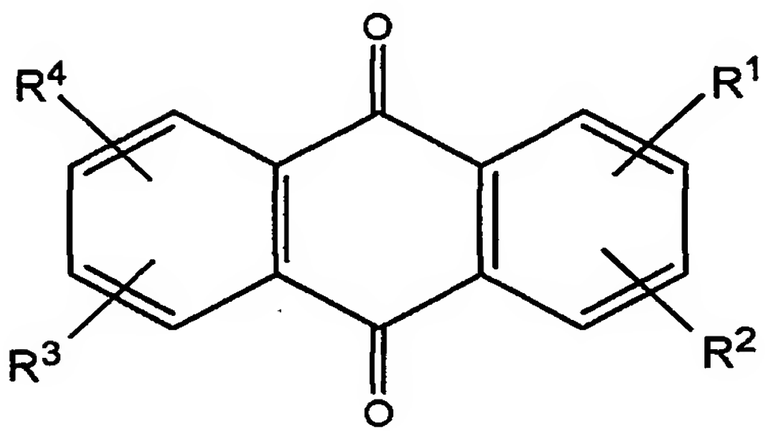
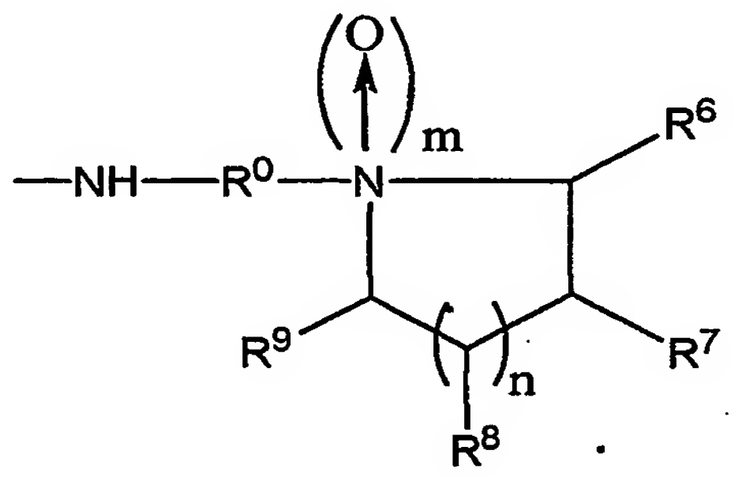
CLAIMS

1. An anthraquinone compound of the general formula I or a salt thereof



I

in which R^1 to R^4 are each selected from the group consisting of H, C_{1-4} alkyl, X^1, $-NHR^0N(R^5)_2$ in which R^0 is a C_{1-12} alkanediyl and each R^5 is H or optionally substituted C_{1-4} alkyl, and a group of formula II



(II)

in which at least one of R^6, R^7 and R^8 is selected from X^2, and X^2 substituted C_{1-4} alkyl and any others are H or C_{1-4} alkyl; R^9 is selected from H, C_{1-4} alkyl, X^2 and X^2 substituted C_{1-4}-alkyl;

m is 0 or 1;

n is 1 or 2;

X^1 is a halogen atom, a hydroxyl group, a C_{1-6} alkoxyl group, an aryloxy group or an acyloxy group; and

X^2 is a halogen atom, a hydroxyl group, a C_{1-6} alkoxyl group, an aryloxy group or an acyloxy group;

provided that at least one of R^1 to R^4 is a group of formula II.

2. A compound according to claim 1 in which R^1 and R^2 are each a group of formula II.

3. A compound according to claim 1 in which R^1 is a group of formula II and R^2 is $NHR^0N(R^5)_2$.

4. A compound according to claim 3 in which each R^5 is the same and is H or CH_3.

5. A compound according to any of claims 2 to 4 in which R^1 is at position 4 in the anthraquinone ring system and R^2 is in position 1.

6. A compound according to any preceding claim in which R^3 and R^4 are selected from H and hydroxyl.

7. A compound according to claim 6 in which R^3 and R^4 are both hydroxyl and are substituted at positions 5 and 8 in the anthraquinone ring system.

8. A compound according to claim 6 in which R^3 and R^4 are both H.

9. A compound according to any preceding claim in which m is 1.

10. A compound according to any of claims 1 to 8 in which m is 0.

11. A compound according to any preceding claim in which n is 2.

12. A compound according to any preceding claim in which X^2 is a halogen atom or a leaving group.

13. A compound according to claim 12 in which X^2 is chlorine.

14. A compound according to any preceding claim in which either

i) R^6 is CH_2X^3 and R^7 is H; or

ii) R^6 is H and R^7 is X^3

in which X^3 is a halogen atom or a leaving group.

15. A compound according to claim 14 in which R^6 is CH_2X^3 and R^7 is H.

16. A compound according to claim 15 in which n is 2 and R^9 is CH_2X^3 in which X^3 is the same as X^3 in R^6.

17. A compound according to claim 9 or claim 10 and/or claim 12 for use in a method of treatment of an animal by therapy.

18. A composition comprising a compound according to claim 9 or

claim 10 and/or claim 12 and an excipient.

19. A composition according to claim 18 which is a pharmaceutical composition and in which the excipient is a pharmaceutically acceptable excipient.

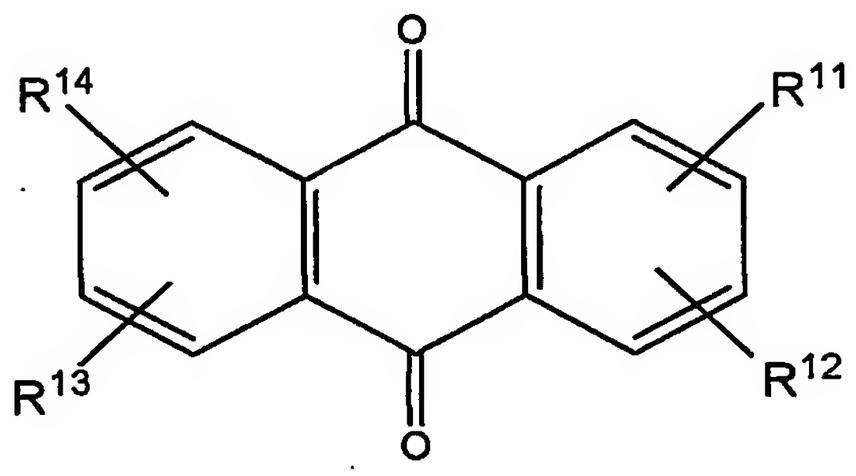
20. Use of a compound according to claim 9 or 10 and/or claim 12 in the manufacture of a medicament for use in the treatment of an animal by therapy.

21. Use according to claim 20 in which the animal is a human.

22. Use according to claim 20 or claim 21 in which the animal is suffering from a tumour and the therapy is anti-tumour therapy.

23. Use according to claim 22 in which the compound is a compound according to claim 9 and in which the therapy additionally involves administration of a cytotoxic agent and/or radio therapy of the tumour.

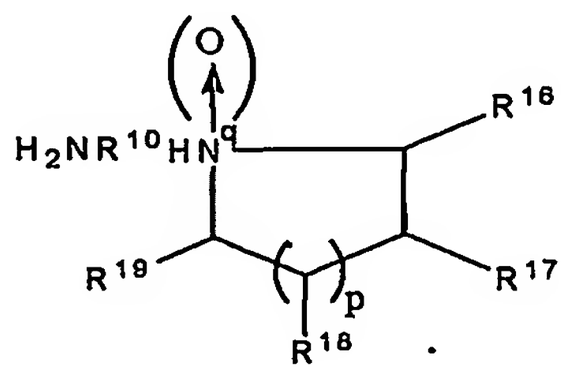
24. A synthetic method in which a compound of the formula III



III

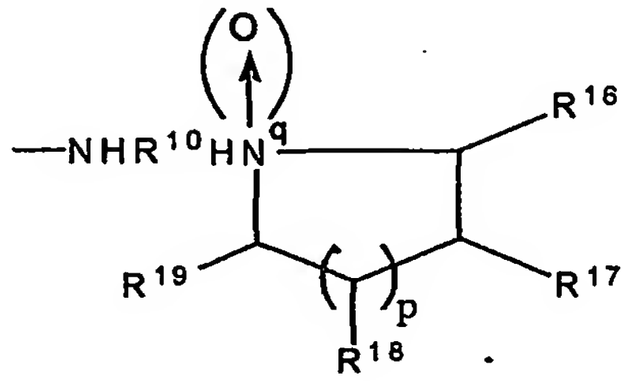
in which R^{11} to R^{14} are each selected from H, X^4, hydroxyl, C_{1-4} alkoxy, acyloxy, a group $-NHR^{10}N(R^{15})_2$ in which R^{10} is C_{1-12} alkane diyl and each R^{15} is H or optionally substituted C_{1-4} alkyl, and in which X^4 is a halogen atom or a leaving group provided that at least one of R^{11} to R^{14} is X^4;

is reacted with a cyclic aminoalkylamine compound of the general formula IV



(IV)

such that the group X^4 is replaced in a nucleophilic substitution reaction by a group of formula V



(V)

in which either at least one of R^{16}, R^{17} and R^{18} is selected from X^5 and X^5 substituted C_{1-4} alkyl and any others are H or C_{1-4} alkyl, and R^{19} is selected from H, C_{1-4} alkyl, X^5 and X^5 substituted C_{1-4} alkyl

X^5 is hydroxyl or a protected hydroxyl, or X^5 is a leaving group or a halogen atom different to X^4 and q is 0 or 1.

25. A method according to claim 24 in which at least one group X^5 is hydroxyl or protected hydroxyl and in which the product is reacted with a halogenating compound optionally after deprotection to replace the or each X^5 hydroxyl group by a halogen atom.

26. A method according to claim 25 in which the halogenating agent is a chlorinating agent.

27. A method according to any of claims 24 to 26 in which q is 0 and the product is oxidised at the ring nitrogen atom to form the corresponding amine oxide (q is 1).

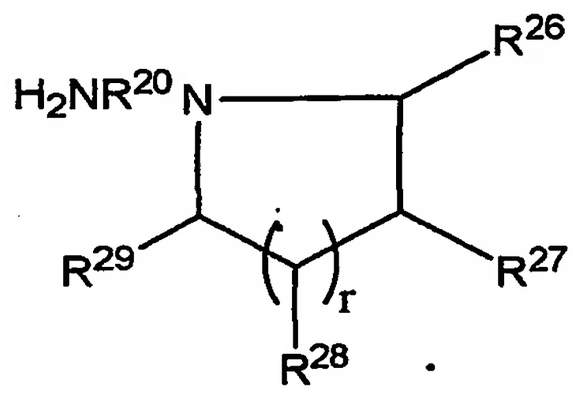
28. A method according to any of claims 24 to 28 in which one of R^{11} to R^{14} is a group -NH $R^{10}N(R^{15})_2$ and which involves the preliminary step of reacting a precursor compound in which the corresponding group X^6 where X^6 is a halogen atom or a leaving group, with an acyclic aminoalkylamine compound of general formula VI

$H_2NR^{10}N(R^{15})_2$ (VI)

in a preliminary nucleophilic substitution reaction in which X^6 is replaced by the group -$NHR^{10}N(R^{15})_2$, in which R^{15} is H or an optionally substituted C_{1-4} alkyl group.

29. A method according to any of claims 23 to 26 in which R^{11} and R^{12} are the same and are X^5 and in which 2 equivalents of the cyclic aminoalkylamine compound IV are reacted whereby both groups X^4 are replaced by the said group of general formula V.

30. A compound of the general formula VII



(VII)

in which R^{20} is a C_{1-12}-alkanediyl group and either R^{26} is CH_2Cl, and R^{27} is H, or R^{26} is H and R^{27} is Cl;

R^{29} is H or is the same group as R^{26};

the or each R^{28} is H or is the same group as R^{27}; and

r is 1 or 2.

31. A compound according to claim 30 in which R^{20} is $(CH_2)_2$.

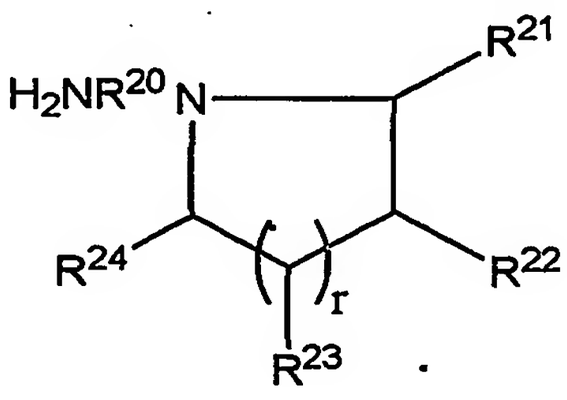
32. A compound according to claim 30 or claim 31 in which R^{26} is CH_2Cl, R^{27} is H and R^{29} is selected from H and CH_2Cl.

33. A compound according to claim 30 or claim 31 in which R^{26} is H, R^{27} is Cl, R^{29} is H and R^{28} is H.

34. A compound according to any of claims 30 to 33 in which r is 1.

35. A compound according to any of claims 30 to 33 in which r is 2.

36. A method of synthesis of a compound as claimed in claim 30 in which a hydroxyl-substituted cyclic tertiary amine of the general formula VIII



(VIII)

in which R^{20} and r are as defined in claim 30

either R^{21} is CH_2OH and R^{22} is H

or R^{21} is H and R^{22} is OH;

R^{24} is H or is the same group as R^{21}

the or each R^{23} is H or is the same group as R^{22};

is amine-group protected, is then chlorinated by a process in which the OH is replaced by Cl, and is deprotected to afford the desired compound of formula VII.